

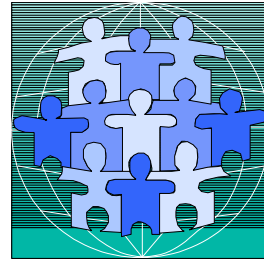
**POPULATION POLICY,  
REPRODUCTIVE HEALTH AND  
HUMAN CAPITAL:**

*A FRAMEWORK FOR EXPANDING  
POLICY DIALOGUE*

*Policy Occasional Papers*

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The **POLICY** Project

**The Futures Group International**

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**Research Triangle Institute (RTI)**

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**POPULATION POLICY, REPRODUCTIVE HEALTH AND HUMAN CAPITAL:**

***A FRAMEWORK FOR EXPANDING POLICY DIALOGUE***

**April 1997**

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**The POLICY Project**

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## Preface

The goal of the POLICY Project is to create supportive policy environments for family planning and reproductive health programs through the promotion of a participatory policy process and population policies that respond to client needs. The project has four components—policy dialogue and formulation, participation, planning and finance, and research—and is concerned with crosscutting issues such as reproductive health, HIV/AIDS, gender, and intersectoral linkages.

The POLICY Project is implemented by The Futures Group International, Inc., in collaboration with Research Triangle Institute and The Centre for Development and Population Activities. The U.S. Agency for International Development (USAID) funds the project under Contract No. CCP-C-00-95-00023-04.

*POLICY Occasional Papers* are intended to promote policy dialogue on family planning and reproductive health issues and to present timely analysis of issues that will inform policy decision making. The papers are disseminated to a variety of policy audiences worldwide, including public and private sector decision makers, technical advisors, researchers, and representatives of donor organizations.

An up-to-date listing of POLICY publications is available on the FUTURES home page. Copies of POLICY publications are available at no charge. For more information about the project and its publications, please contact:

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## Introduction

The International Conference on Population and Development (ICPD) held in Cairo in September 1994 and the events leading up to it have been applauded as the culmination of a profound shift in the rationale for and role of population policy. The 1994 ICPD shifted the focus of population policy from an emphasis on achieving demographic goals for reduced population growth to meeting the basic reproductive health needs of citizens. McIntosh and Finkle (1995) suggest that the process leading to this most recent shift in population policy has been influenced more by ideological and political preferences than by scientific analysis. There is concern that it will be difficult to persuade governments of the societal benefits of investments in reproductive health without compelling, scientific analysis to complement rights-based arguments for a government role in the promotion of reproductive health and welfare.

This paper suggests ways in which policy analysis guided by human capital theory might inform national debates concerning the implementation of programs aimed at achieving the reproductive health priorities set forth in the ICPD *Programme of Action*. Linking reproductive health policies and programs to their likely human capital impacts shows policymakers that, in addition to helping meet individuals' basic human rights to reproductive health, investments in reproductive health services benefit the public interest by increasing the productive potential of individuals and their immediate social unit — the family or household.<sup>1</sup> Moreover, increases in productive potential at the individual, family or household level cumulate to increases in productive potential at the societal level. The economic rationale and supporting evidence provided by a human capital approach to the promotion of reproductive health may help strengthen the case for adopting policies and financing programs that will make the right to reproductive health services and information a reality.

One of the particular strengths of human capital theory is its ability to capture both the direct and indirect effects associated with social investments. Because of the close and complex linkages between social and health issues in reproductive health, such a synergistic approach is especially well-suited as an organizing framework for policy discussion. Moreover, a human capital approach places discussion of reproductive health in a broader development context. Framing reproductive health policy discussion in a development context should broaden its constituency, while upholding its basic appeal as a woman-centered approach, notably one that addresses “reproductive health in the way women experience it . . . as an integral part of everyday life” (Freedman and Isaacs, 1993, p. 19).

Public debate over reproductive health policy matters has often been stifled by policymakers' fears of inciting criticism from the left and right over such sensitive issues as abortion, the rights of women, and sexual politics. A human capital approach brings the economic aspects of reproductive health into policy debate, thereby contributing additional scientific or empirical evidence that is essential to the evaluation of policy alternatives. For many policymakers, policy analysis involves evaluating alternative solutions to social problems in terms of their costs and benefits. As decisions about financing the *Programme of Action* appear on the policy agendas of ministries of budget and finance, effective policy advocacy will require learning to “speak their language.” This paper seeks to define a common language that facilitates a broader discussion of reproductive health policy and perhaps, more importantly, its implementation.

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<sup>1</sup> Households vary in structure across countries and cultures. For purposes of this paper, the reader may think of a household as the smallest cohesive and temporally stable unit in which income is received and redistributed.

## What is Human Capital?

The origin of the concept of human capital may be traced to efforts in the 1950s and 1960s to understand the causes of economic growth. At that time, the primary framework for understanding economic growth was the production function. In its most general form, a production function describes a process by which inputs (such as machines, labor, and natural resources) are combined with technology to produce output. To produce cars, for example, one hires labor and provides workers with tools (a kind of capital) and raw materials. The end result is a car, the output.

If economic development is defined as increasing per capita income or gross domestic product (GDP), the solution to the problem of “underdevelopment” should be obvious: increase the amount of inputs used in the production process, which in this case means capital and/or labor. However, as this theory of development was tested over time by comparing the growth rate of inputs used in production to the rate of increase of output produced given the level of technology, certain inconsistencies became apparent. What these studies revealed was that a large residual element of output growth remained *after* controlling for the growth in inputs and the level of technology, suggesting that some other factor was contributing significantly to the growth in output.

One of the explanations advanced to account for this residual was human capital. Human capital can be thought of as a separate, “non-material” input akin to regular capital, which functions as an element in determining how productive the other inputs used will be in producing output (i.e., a factor that affects overall input quality and productivity). Becker defines investments in human capital as “activities that influence future monetary and psychic income by increasing the resources in people” (1993, p.1). The example of an apprentice and a craftsman may help to clarify the concept. Both individuals use the same tools and raw material (types of physical capital), but the craftsman is able to use these materials more productively than the apprentice because he has had many years of practice as well as some formal training. His experience and training are his human capital. In this paper, human capital is defined as any quality specific to and undetachable from a person that allows her (or him) to perform economic tasks more efficiently, vigorously, or consistently—or allows her (him) to lead a happier life.

How does human capital — for example, good general health — contribute to economic growth? *World Development Report 1993: Investing in Health* identifies four ways: (1) by reducing production losses caused by worker illness (for example, by reducing the number of sick days taken); (2) by permitting the use of natural resources that have been totally or nearly inaccessible because of disease (for example, fertile riverside zones may be cultivated once river blindness is eradicated); (3) by increasing the enrollment of children in school and enhancing their ability to learn (healthy children are more likely to attend school and to perform well); and (4) by freeing up resources — both public and private — that would otherwise have to be spent on treating illness so that they may be invested in other kinds of human capital formation activities (World Bank, 1993). Three of the four pathways described above are enhanced by good reproductive health (only the second, concerning natural resource use, is not). Reproductive health also is likely to have additional benefits, as this paper seeks to demonstrate.

## Benefits of Reproductive Health for the Development of Human Capital

What do we mean by reproductive health? The *Programme of Action* views reproductive health as a lifelong process inextricably linked to the status and roles of women in their homes and societies.

Reproductive health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and its functions and processes. Reproductive health therefore implies that people have the capability to reproduce and the
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freedom to decide if, when and how often to do so. Implicit in this last condition are the rights of men and women to be informed and to have access to safe, effective, affordable and acceptable methods of family planning of their choice, as well as other methods of their choice for regulation of fertility which are not against the law, and the right to access to appropriate health care services that will enable women to go safely through pregnancy and childbirth and provide couples with the best chance of having a healthy infant. In line with the above definition of reproductive health, reproductive health care is defined as the constellation of methods, techniques, and services which contribute to reproductive health and well-being through preventing and solving reproductive health problems. It also includes sexual health, the purpose of which is the enhancement of life and personal relations, and not merely counseling and care related to reproduction and sexually transmitted diseases.

Poor reproductive health conditions exact a high toll in the developing world. In developing countries, reproduction is the principal cause of female mortality in the reproductive ages (Maine et al., 1994) and has important long- and short-term implications for women's health, productivity, and investments in children. At least 500,000 maternal deaths occur worldwide every year, nearly all in developing countries (Stanton et al., 1995). By contrast, maternal mortality has become an exceedingly rare event in industrialized countries due to improvements in prenatal and delivery care, widespread availability of safe and effective contraception (which has allowed women to avoid having large numbers of closely spaced children), and the availability of safe, legal abortion. In addition to maternal mortality, increased attention has been placed on recognizing the deleterious effects of reproductive tract infections (RTIs), sexually transmitted diseases (STDs), and HIV/AIDS on women's reproductive health.

Because of the high proportion of preventable adult mortality and morbidity due to poor reproductive health conditions, improvements in reproductive health have special relevance to the aforementioned pathways linking good general health to economic growth. Moreover, the current status of a woman's reproductive health has a profound impact on the human capital development of her children and, by consequence, on future social and economic development outcomes. The effects of reproductive health investments are highly leveraged because the health of household members depends in large measure on the health of mothers.

#### *Policies and Programs to Improve Reproductive Health and Build Human Capital.*

Reforms and investments aimed at improving educational opportunities and health care for women would almost certainly improve the human capital of women. However, expansion of programs and services for girls and women must be accompanied by measures to enhance women's ability to choose a future course for their own and their children's lives.<sup>2</sup> A school building stocked with teachers is of no use to a woman who cannot attend because she is barred by tradition, occupied with infants, or debilitated by chronic disease. Similarly, the improved availability of contraception is immaterial if use or nonuse is not voluntary. Reproductive choice and the health it engenders have proved most likely to occur when a woman has some basic education, knowledge about family planning methods and access to them, and some measure of current and future economic security (Sen, 1994). When properly targeted to women, especially poor women, such investments stay with them and provide returns for their whole lives.

Education, good health, and strong cognitive ability secured by good nutrition during childhood and adolescence are examples of the human capital outcomes that social programs seek to achieve. Unlike other forms of capital (e.g., bank loans, bicycles, or land), these outcomes are qualities that cannot

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<sup>2</sup> Not all women are mothers—it is important to meet the reproductive health needs of childless women as well.

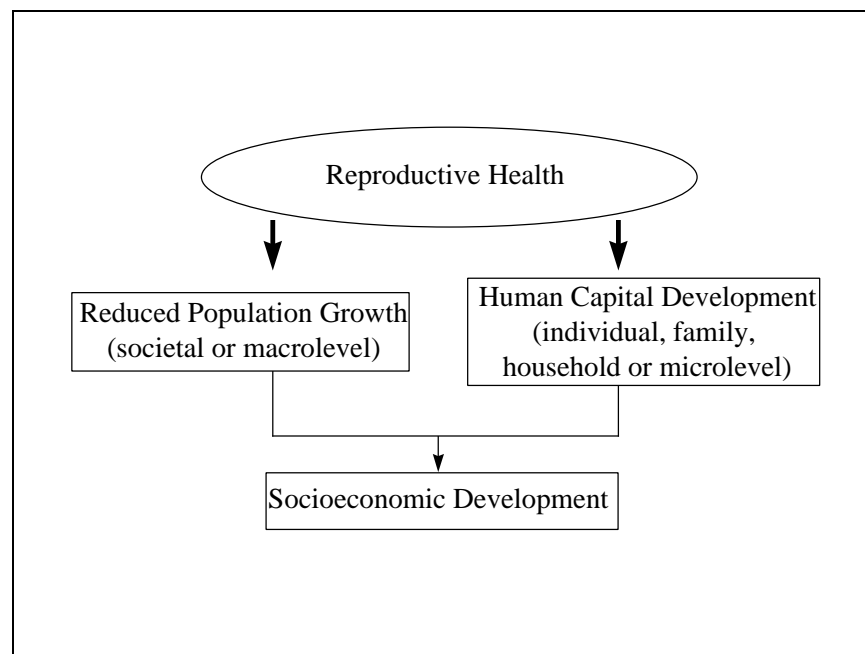


be taken away from the individual. For women, human capital — particularly in the form of schooling and good reproductive and general health — provides returns for themselves as well as their families, especially for their young children (World Bank, 1995). In sum, the most effective and enduring development solutions are those that place a premium on expanding individual voluntary choice and call for investments in the bundle of social services, including reproductive health services, that respond to the basic and multiple needs of individuals.

## Reproductive Health and Human Capital: A Conceptual Framework

To gain a better understanding of how to design reproductive health policies and programs to promote human capital development, this paper relies on a conceptual framework built in three stages. The first stage presents an overview of how reproductive health contributes to development both directly through human capital accumulation and indirectly through the loosening of resource constraints resulting from reduced population growth. The second stage develops more fully the mechanisms through which reproductive health augments human capital. Finally, the third stage synthesizes the concepts and linkages presented in the first two stages.

Figure 1. Simple Conceptual Framework



**Stage 1. Simple Conceptual Framework.** Improvements in reproductive health contribute directly to socioeconomic development by affecting individual outcomes and indirectly by loosening resource constraints. Figure 1 presents a simplified framework summarizing these linkages.

First, improvements in reproductive health have consequences at the individual, family and household level (micro level). Reproductive health directly contributes to socioeconomic development by

increasing the human capital of women. Indirectly, reproductive health contributes to the human capital development of young children by keeping their mothers healthy.<sup>3</sup>

Second, improvements in reproductive health have consequences at the societal level (macro level) through reduced population growth. Women who have access to the means to control their reproduction and reproductive outcomes typically have fewer children (Tsui, 1991), which in turn helps to slow population growth.<sup>4</sup> Reduced population growth eases pressure on natural resources and overstretched public services and contributes to sustainable development (see Birdsall, 1988).

While reproductive health contributes directly to socioeconomic development through human capital development and reduced population growth, there are additional contributions through linkages at the macro and micro levels. Safe, effective, and affordable reproductive health services provide women with the opportunity to enjoy nonreproductive as well as reproductive roles in society, thereby contributing directly to socioeconomic development via increased per capita income. Expanding women's opportunities to assume nonreproductive roles contributes to socioeconomic development either through increases in their productivity in or outside the household or by enhancing the quality of time that they provide their children (see Schultz, 1993).

In addition, promotion of a mother's reproductive health has an impact on the formation of her children's human capital by encouraging smaller family size and greater attention to child development.<sup>5</sup> (Associated with smaller family size is a reduction in the number of unwanted births, which has independent effects on the health and development of children—see Jensen, Ahlburg and Costello, 1996.)<sup>6</sup> All other things being equal, parents with fewer children are more able to make greater investments of their time, typically mother's time, and other resources in each child than are parents with more children. Children from smaller families accumulate greater amounts of human capital, which fosters their mental, physical, and emotional development.

Figure 1, however, does not specifically address how reproductive health increases human capital and promotes socioeconomic development. The pathways connecting reproductive health and human capital formation are addressed in the next section.

### ***Stage 2. Mechanisms through which Reproductive Health Augments Human Capital.***

Investments that promote reproductive health improve a woman's human capital by contributing to her knowledge, health, nutrition and influence over resources and individual or household decision making.<sup>7</sup>

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<sup>3</sup> While mother's health is especially important for infants and young children, some evidence suggests that it is important for the well-being of adolescent children as well. Recent data from Tanzania suggests that adolescent girls are more likely to be withdrawn from school when one of their parents becomes debilitated by or dies from HIV/AIDS (Ainsworth and Over, 1996). One expects, too, that older children and adolescents who lose their mothers may be more likely to be abandoned or displaced as a result of their father's remarriage; streetchildren, for example, might include a higher proportion of children whose mothers are seriously ill or deceased.

<sup>4</sup> Women who have the best access to family planning services are also likely to have access to other social services such as health and education, which may affect their fertility aspirations.

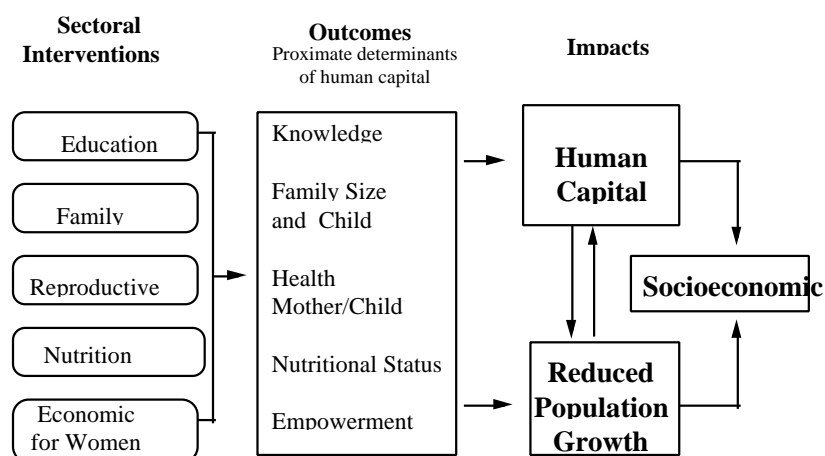
<sup>5</sup> As the value of a woman's time increases (measured by the wage she is able to earn in the marketplace or the estimated value of the wage she would earn were she to participate in the labor force), it is hypothesized that she is motivated to have fewer children in whom she may invest greater resources, particularly the resource of her time. Education is the vehicle through which the wage value of one's time typically increases. Better educated women are also better equipped to seek out and use reproductive health services, including contraceptive services that allow them to have the number and spacing of children that they desire.

<sup>6</sup> Studies have shown that unwanted children suffer consequences of being unwanted throughout their lifetime (Kubicka et al., 1995).

<sup>7</sup> According to Batliwala (1994), women's empowerment is determined in large measure by the extent of her control over resources and individual or household (or family) decision making.

In Figure 2, the boxes on the left show categories of interventions that contribute to improved reproductive health: education, family planning, reproductive health services, nutrition and expansion of economic opportunities for women. Each box represents a bundle of sector-specific interventions. Because family planning may be considered first as a means of fertility regulation with direct impact on family size and child development, and second, as a means of improving child and maternal health, family planning and reproductive health investments are placed in separate boxes.<sup>8</sup> Nutrition is also separated from health because its primary impact is on nutritional status, which in turn influences health status, a principal secondary impact. The recent framework developed by McGinn and colleagues (1996) operationalizes the definition of reproductive health embodied in the *Programme of Action* and is used to identify the range of services that might be included in the box labeled “reproductive health.” These reproductive health interventions include services with the goals of preventing unwanted pregnancy; reducing maternal morbidity and mortality; reducing reproductive tract infections (RTIs), including sexually transmitted diseases (STDs); reducing HIV/AIDS; reducing reproductive cancers; preventing female genital mutilation; preventing sexual and gender-based violence; and reducing and helping manage infertility.

**Figure 2. Human Capital Framework for Reproductive Health**



Programs associated with the interventions at the far left of the framework have an impact on the specific factors that directly create human capital, the proximate determinants of human capital. Examples of these determinants include knowledge, family size and child development, health status, nutritional status and female empowerment. Both individually and collectively, improvements in these outcomes — most of which are identified in the *Programme of Action*’s reproductive health agenda — will increase human capital. While experienced at the micro level (i.e., the level of the individual, family or household), the human capital outcomes highlighted in Figure 2 also affect national production and

<sup>8</sup> While family planning and reproductive health services are often integrated, many who need and/or use family planning services (including men) are not ill or in imminent need of reproductive health care.

population dynamics at the macro level.<sup>9</sup> Lower population growth rates also contribute directly to development by relaxing macroeconomic resource constraints (Birdsall, 1988). The following discussion illustrates some of the ways in which the proximate determinants influence human capital formation within the family or household.

- *Knowledge* helps women work smarter and be better caretakers of their children. In addition, the experience of attending school grants women the confidence they need to navigate bureaucracies (see Levine, 1996).
- Reduced *family size* allows a woman to spend more time on activities that either directly improve her human capital (e.g., by using time otherwise spent on childrearing to work or acquire skills) or that help her children develop mentally and emotionally. In addition, the wantedness of children has a long-term impact on their physical, social, and mental development.
- Better *health status* improves the level of effort a woman is able to put forth in directly productive activities or in activities related to improving her children's development.
- Although *nutritional status* is often thought of in terms of the ability to ward off future or proximate health problems, it also directly and independently affects human capital. The day-to-day level of caloric intake has an important influence on the level of physical and mental effort a person is able to exert, independent of her general health status (Fogel, 1994).
- Finally, enhancing *economic opportunities for women* expands the choices available to women, thereby enhancing their ability to benefit from other social investments, notably education and family planning. Given expanded choices, women may be empowered to direct their skills and energy to activities in which they are most productive or that they find the most rewarding.<sup>10</sup>

One potential drawback of the framework outlined in Figure 2 is that it fails to illustrate the extent to which policies and program interventions in one sector can produce positive feedback in another. The many interactions among social program interventions account for some of their greatest impacts (Schultz, 1994b). Moreover, these interactions are also evident at the household or family level. Individuals make decisions about the use of education, health or contraception that are often contingent upon one another. For example, the decision to enroll a girl child in school may be based on expectations that she will pursue nonreproductive roles that will have, in turn, been partly shaped by her mother's reproductive experience and exposure to economic opportunities for women (see Griffin and Levine, 1994). As a second example, poor maternal nutrition during pregnancy can lead to low birthweight babies who face increased risk of health and developmental complications. These linkages are clarified in the next stage of the conceptual approach.

**Stage 3. *Synthesis of Concepts and Linkages.*** Social programs or investments often have impacts outside the sector to which they are targeted. Therefore, if one only considers the direct effect associated with a program — for example, the knowledge gained from formal education — the full impact of the program is often underestimated. Education also benefits individuals by making them better consumers of social and health services. Griffin, Levine and colleagues in Tanzania pioneered an approach to capturing the full effects associated with social investments (World Bank, 1995; see also Griffin and Levine, 1994). Table 1 shows how such an approach might be relevant to reproductive health policy and program development.

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<sup>9</sup> The reproductive health interventions identified in Figure 2 contribute to a set of outcomes that are also involved in shaping supply and demand for children.

<sup>10</sup> The definition used here allows that human capital may contribute to increased happiness or satisfaction.

Often programs are assessed in terms of their benefits to individuals. Griffin and Levine suggest that social programs benefit more than the individual who consumes the service. To estimate the effects of a program fully, one needs to expand the unit of analysis to include others who are likely beneficiaries of that individual's participation in a particular program. A logical unit of analysis for studying the full effects of program interventions is the household or family — for practical purposes, the smallest, cohesive and temporally stable unit where income is received and distributed (for convenience sake, the term “household” is used from here on). Households, or rather their members, are the principal consumers of government-funded social services. According to human capital theory, household decisions about the consumption of social services are assumed to be guided by strategies aimed at increasing the well-being of the collective unit. However, anthropologists have documented evidence from a variety of settings that suggests that women and men do not make the same choices regarding expenditures and human capital investments. Clearly, the approach for assessing the human capital benefits of selected interventions must be adapted to a specific cultural context.

Table 1 expands the Tanzania framework (World Bank, 1995) to specifically consider reproductive health. Inputs, in the shape of social programs and investments, are listed down the first column with human capital outcomes described across the top row. The direct impact of any given program is highlighted by a “**D**”. Indirect impacts, such as the impact of education on fertility reduction, are indicated by a “+”. Table 2 is an expanded version of Table 1 that illustrates the diversity of the possible direct and indirect effects associated with different categories of reproductive health interventions. Both Table 1 and Table 2 are meant to illustrate the usefulness of the framework; neither is comprehensive nor necessarily applicable to all countries.

Table 1. Illustrative Impacts of Selected Interventions on Proximate Determinants of Human Capital

Sectoral Interventions	Proximate Determinants of Human Capital					
	Knowledge	Family Size and Child Development	Health Status		Nutritional Status	Empowerment
			Women's	Child's		
Education	<b>D</b>	+	+	+	+	+
Family Planning		<b>D</b>	+	+		+
Reproductive Health		+	<b>D</b>	<b>D</b>	+	+
Nutrition	+	+	+	+	<b>D</b>	
Economic Opportunities	+	+	+	+		<b>D</b>

“**D**” indicates the direct or principal intended effect associated with the program or investment.

“+” indicates a hypothesized positive indirect (or secondary) effect.

A strength of Table 1 is that it shows how interventions directly and indirectly influence the production of human capital, often through multiple paths. For example, iron supplements (under the category of *nutrition* programs) directly prevent iron-deficiency anemia, thereby improving *nutritional status*. An indirect effect is that reducing iron-deficiency anemia prevents anemia-related maternal complications, thereby reducing the incidence of maternal morbidity and mortality and improving *maternal health*. Furthermore, average birthweights increase—as do prospects for *child survival*—with decreased incidence of iron-deficiency anemia. If both the mother and her child have sufficient iron, the

child's ability to learn will be greater (both in the short and long term),<sup>11</sup> leading to a positive effect on *knowledge*. Finally, reduced infant mortality in the household will mitigate both insurance and replacement motives for high fertility,<sup>12</sup> thereby contributing to a reduction in *family size* and likely improvements in *child development*.

How could this framework help in the design of better reproductive health policies, programs and projects? The answer is that it provides a theoretical overview of the mechanisms through which reproductive health interventions increase human capital, improve the quality of human resources and development outcomes. The framework shown in Table 2 can be used to examine the impacts of social sector interventions on the formation of human capital in a variety of country settings. It also can be used to identify research needs that would guide reproductive health policy discussion and project design.

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<sup>11</sup>As noted above, healthy mothers are able to devote greater attention to their young children, expanding the initial socialization experiences which are important for future learning outcomes.

<sup>12</sup> The replacement motive for fertility refers to the theory that in an environment where infant mortality is high, a couple will compensate for recent infant deaths with quick subsequent conception. The insurance motive for fertility is similar to the replacement motive except that there is the additional notion that a couple will anticipate infant deaths and have high fertility to compensate for the expected high mortality.

Table 2: Illustrative Impacts of Selected Interventions on Human Capital Formation — Expanded

	<b>ILLUSTRATIVE IMPACTS ON HUMAN CAPITAL FORMATION</b>					
<b>SECTORAL INTERVENTIONS</b>	KNOWLEDGE	FAMILY SIZE AND CHILD DEVELOPMENT	MATERNAL HEALTH STATUS	CHILD HEALTH STATUS	NUTRITIONAL STATUS	EMPOWERMENT
<b><sup>E</sup>EDUCATION</b>						<b>2</b>
Increase female educational enrollment.	<b>D</b>	Grants women nonreproductive role models and opportunities which decrease desire for large family size.	Increases utilization of maternal and women's health services.	Increases utilization of children's health services.	Increases access to school-based nutritional supplements.	Access to education, especially secondary education, increases opportunities for labor force participation.
Prevent permanent expulsion of pregnant girls.	<b>D</b>	By allowing girls to complete their schooling, they will be better equipped to support themselves and their child and less vulnerable to pressures to have a second child soon after the first.	Decreases risk of unsafe abortion, unintended pregnancy and youthful childbearing.	Reduces risks associated with early childbearing.		Opportunities for labor force participation increase with level of educational attainment.
<b><sup>F</sup>FAMILY <sup>P</sup>LANNING</b>						
Access to family planning information and services for delaying births.	Avoids unintended pregnancies that might interfere with education.		Prevents reproductive morbidity associated with (very) young childbearing.	Improves birth outcomes and infant and child health by preventing births to young women.		Avoids unintended pregnancies that might limit pursuit of nonreproductive roles.
Access to family planning information and services for spacing births.		<b>D</b>  Longer birth intervals contribute to smaller family size.  Longer intervals allow more maternal or parental time for each child during their important developmental years.	Prevents unintended pregnancies, unsafe abortions and reproductive morbidity and mortality associated with them.	Encourages longer breastfeeding, reduces risk of infection within HH.		
Access to family planning information and services for limiting births.		<b>D</b>  Allows attainment of desired family size.  Increases cash resources available for investment in the development of each child.	Prevents unwanted pregnancies, unsafe abortions and reproductive morbidity and mortality associated with them. Also, avoids high-parity childbearing among older women who are at greater risk of malpresentation of the fetus and placental abnormalities, both of which can contribute to delivery complications (NAS, 1989).	Avoids high-parity births, which may be associated with higher rates of infant mortality, and births to older mothers, which are at greater risk of congenital abnormalities (though these are rarely fatal) (NAS, 1989).		

	ILLUSTRATIVE IMPACTS ON HUMAN CAPITAL FORMATION					
SECTORAL INTERVENTIONS	KNOWLEDGE	FAMILY SIZE AND CHILD DEVELOPMENT	MATERNAL HEALTH STATUS	CHILD HEALTH STATUS	NUTRITIONAL STATUS	EMPOWERMENT
REPRODUCTIVE HEALTH						
Access to family planning to prevent unwanted childbearing.		Contributes to smaller family size by avoiding unwanted pregnancies.  Wantedness plays a key role in a child's mental, emotional and physical development.	<b>D</b>  Prevents unsafe abortion and associated morbidity and mortality. Avoids risks associated with additional pregnancy(ies).	<b>D</b>  Reduces child morbidity and mortality due to neglect (conscious or unconscious).		
Antenatal care.		Antenatal care can improve prospects for healthy birth outcomes, thereby reducing desired family size (insurance motive).	<b>D</b>  By identifying and treating conditions that could complicate pregnancy and delivery, reduces maternal morbidity and mortality.	Improves prospects for healthy birth outcomes and reduces child morbidity and mortality.		
Emergency treatment for obstetric complications.		Emergency treatment for obstetric complications increases chance of healthy birth outcomes, thereby reducing desired family size (insurance motive).  Also helps prevent developmental disabilities that may occur during complicated delivery.	<b>D</b>  Reduces morbidity and mortality associated with pregnancy and delivery complications.	<b>D</b>  Increases likelihood of a healthy birth outcome.		Reduces pregnancy-related illnesses and impairments that undermine women's social and economic productivity.
RTI/STD screening and treatment.		Maternal STDs (for example, syphilis) can cause congenital defects and other disabilities that impair child development.	<b>D</b>  Reduces morbidity and mortality due to untreated RTI/STDs.	<b>D</b>  Reduces likelihood of infant or childhood disability.		
HIV/AIDS prevention.			<b>D</b>  Reduces morbidity and mortality due to HIV/AIDS.	<b>D</b>  Reduces incidence of pediatric AIDS and resulting morbidity and mortality.		
Cervical cancer information and early diagnosis.			<b>D</b>  Reduces female morbidity and mortality due to cervical cancer.			



	ILLUSTRATIVE IMPACTS ON HUMAN CAPITAL FORMATION					
SECTORAL INTERVENTIONS	KNOWLEDGE	FAMILY SIZE AND CHILD DEVELOPMENT	MATERNAL HEALTH STATUS	CHILD HEALTH STATUS	NUTRITIONAL STATUS	EMPOWERMENT
<b>REPRODUCTIVE HEALTH (cont.)</b>						
Education to increase awareness about and reduce the social acceptability of female genital mutilation (FGM).			<b>D</b> Reduces female morbidity and mortality due to FGM.			
Education to reduce sexual and gender-based violence.			<b>D</b> Reduces female morbidity and mortality due to sexual and gender-based violence.			Destigmatizes victims of violence.
Infertility diagnosis and treatment.		Encourages achievement of desired family size.	<b>D</b> Contributes to women's health and well-being.			Prevents marginalization and abandonment of subfecund women.
<b>NUTRITION</b>						
Breastfeeding promotion.		Increases duration of birth interval thereby allowing more maternal or parental time to be invested in each child.	Reduces risk of postpartum hemorrhage.	Increases infant immunity.	<b>D</b> Increases maternal nutritional strain, but provides ideal nutrition for child.	Limits labor force participation.
Micronutrient fortification and supplementation.	Increases learning capacity.	.	Decreases anemia which is responsible for increased vulnerability to infection and hemorrhage during delivery or abortion.		<b>D</b> Prevents micronutrient deficiencies.	Increases labor force participation by increasing productivity.
<b>EXPANSION OF ECONOMIC OPPORTUNITIES</b>						
Grant women property rights.	Increases likelihood of household investment in girls' education.	Reduces son preference motive for fertility.	Reduces women's need to practice prostitution and helps avoid related STD/HIV risks.	Reduces disparity between women's and men's nutritional status.		<b>D</b> Women's rights within household and society improve.
Increase women's access to credit.			Increases expenditures on women's health.	Increases expenditures on child health.	Increases expenditures on nutrition.	<b>D</b> Improves woman's bargaining position within the household.

## Empirical Evidence

To some extent, the notion that interventions affecting reproductive health contribute positively to human capital formation is an empirically testable hypothesis. A logical question is then, "What is the extent of the empirical evidence supporting the linkages between these interventions and human capital?"

The following points are of importance in answering this question. First, the empirical evidence of the beneficial impacts of education, general health and nutrition on human capital formation is extensive and persuasive (see Schultz, 1994a). Second, the empirical evidence substantiating the economic benefits of some of the interventions affecting reproductive health is significant and growing daily. Third, important gaps exist in the research. Filling these gaps should be a priority for future research related to population policy and program development.

The first point, that the empirical evidence of beneficial impacts of education, general health and nutrition is extensive and persuasive, is well known (see Schultz, 1994a and Fogel, 1994). The literature consists of studies that typically measure the economic returns to improvements in schooling, health and nutrition in terms of productivity, earnings, and wage differentials. For example, concerning the benefits of general good health, a recent study in Côte d'Ivoire and Ghana found that the economic returns to adult health were significant. In Côte d'Ivoire, one less sick day per month implied a 29 percent increase in a worker's annual wage earnings, with approximately two-thirds of this increase due to the worker's higher wage rate. In Ghana, one less sick day per month was linked to a 10 percent increase in hours worked, but showed little increase in wage rates. In both countries, morbidity was linked directly to participation in the labor force. Men who were more likely to experience activity limitations due to illness were less likely to enter the wage labor force (Schultz and Tansel, 1994).

Reproductive health is the subject of a growing number of such studies. Most of the recent studies on this subject have focused on the micro-level consequences of reproductive health conditions and practices and their impact on knowledge, health and nutritional status. Many of these studies have focused on the human capital impact of fertility regulation, with relatively less attention to the economic impact of nonfamily planning reproductive health conditions or practices, such as reproductive tract infections, maternal morbidity or gender-based violence.

In the area of fertility regulation, especially concerning family size limitation, the Population Council has led the way in supporting studies that examine the micro-level consequences of high fertility. *Fertility, Family Size and Structure: Consequences for Families and Children* (1993) contains several studies that demonstrate how family size affects such proximate determinants of human capital as knowledge, children's health and nutritional status. In a study of the micro-level consequences of high fertility behavior for nutrition outcomes, Lalou and M'backé (1993) show that high fertility adversely affects infant health status in Mali through two channels: via mother's nutritional status for nursing infants and via competition among siblings for weaned children. LeGrand and M'backé (1993) explore the implications of teenage pregnancy for child health. They find that teenage pregnancy is associated with significantly poorer prenatal care and vaccination behavior, lower birthweights, earlier weaning and higher mortality, especially during the second year of life.

Several studies in the Population Council volume document the impact of fertility and family size on children's education and time use. For example, DeGraff, Bilsborrow, and Herrin (1993) examine how the number of younger and older siblings affects children's time use in Bicol Province, Philippines. They find that the greater the number of younger siblings, the lower the likelihood that the child will be enrolled in school and the more time the child will devote to domestic work. Using data from Ghana, Lloyd and Gage-Brandon (1993) show that teenage girls are relatively more likely to be withdrawn from

school as new siblings are added to the family.<sup>13</sup> Knodel and others (1989) show that the decline in fertility and cohort sizes in Thailand allowed existing primary school facilities to be adapted to accommodate growing enrollments at the secondary level. These studies are all the more important because of the cross-generational effects they illuminate. The smaller the family size, the more education children are likely to receive, which translates into a direct human capital effect for the next generation.

The linkages between fertility, fertility regulation and human capital formation have been explored extensively using data from the United States and other developed countries. In a pioneering study of the consequences of teenage pregnancy on health and economic outcomes in the United States, Hill (1971) found that teenage pregnancy results in a higher incidence of maternal morbidity among young women, with negative consequences for both aggregate wage rates and labor force participation rates. Furthermore, children of teenage mothers have lower lifetime earnings than children born to women over age 18 (Maynard, 1997).

Other reproductive health interventions have similar positive economic impacts. Perhaps the most compelling evidence is in the area of HIV/AIDS. HIV/AIDS has significant economic consequences at both the macro and micro level (see Ainsworth and Over, 1994). At the macro level, several studies (including Cuddington (1993) for Tanzania) show that AIDS will exact a large macroeconomic toll in terms of an absolute reduction in and a decrease in the average skill level of the labor force. In addition to the shocks to the labor force, capital formation will be negatively affected as savings and investment are redirected to expensive medical care for HIV/AIDS patients.

Of perhaps greater importance, however, are the impacts of HIV/AIDS at the individual and household level. A small but growing body of evidence demonstrates clearly that HIV/AIDS has a negative impact on household and family welfare. One of the most significant economic impacts of AIDS is the increased burden of health care costs for families. Davachi and colleagues (1988) estimated that a single 25-day episode of in-patient treatment for a pediatric AIDS case at a hospital in Zaire costs households three times the average monthly income. Furthermore, the health care expenditures necessary to treat opportunistic infections, such as tuberculosis among those with AIDS, add to this cost. In addition, HIV/AIDS has a negative impact on labor productivity in both agricultural and nonagricultural activities. As AIDS victims grow increasingly sick, their productivity declines and absenteeism increases. Once they are too sick to work, they must be cared for, usually by other household members. This loss of labor and the shift in labor allocation patterns often lead to changes in production behavior that have a negative impact on household welfare (see Barnett and Blaikie, 1992).

The most pernicious effect of HIV/AIDS is its impact on future generations. As a result of heterosexual transmission of HIV/AIDS, when one parent dies of AIDS, the other is likely to die as well, orphaning their children. The increasing number of AIDS orphans is anticipated to become a large problem in many countries. The loss of both parents (or even one) seriously affects the development of these children since they often lose their only source of financial and emotional support. Foster parents or other guardians for the children may be less inclined to pay school fees, purchase books, provide shelter, or procure medical services. Nonorphaned children in AIDS-affected families are also negatively affected by the disease. Katabaro (1993) finds evidence that when an adult member of the household falls ill or dies due to AIDS, the children are likely to be removed from school because they are needed at home or because the family has fewer resources to pay for education. Ainsworth and Koda (1993) find that children who have lost a father or both parents due to AIDS are less likely to enroll in school than are other children. Recent evidence suggests that the toll of the long-term disability of a productive adult in

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<sup>13</sup>Not all linkages are clearcut or as hypothesized. In the study by Jejeebhoy (1992) in India, she finds that in families where girls have fewer siblings, girls are more likely to assume tasks traditionally assigned to boys so that their brothers can pursue additional education.

the household may be disproportionately felt by teenage girls who, in some cases, are the first children to be withdrawn from school once resources become more scarce (Ainsworth and Over, 1996).

The studies cited above provide evidence of the linkages between selected reproductive health inputs and human capital formation. Yet there can be little doubt that further research is needed to advance understanding of the economic benefits associated with good reproductive health. At this point, there is an acute need for more evidence on the impact of the broader set of reproductive health interventions, particularly in areas such as management of STDs other than HIV/AIDS (e.g., syphilis, chlamydia), maternal morbidity and mortality, and gender-based violence, including female genital mutilation. One hopes that judicious use of creative new surveys and research, combined with secondary analyses of the growing body of sex-disaggregated and household datasets, will yield insights into these new areas of interest. Further research, beginning with an exhaustive review of the literature, would likely substantiate the economic reasons for policymakers to rank reproductive health among priority social sector investments.

## **Conclusion**

Improving the human capital of household members is fundamental to improving the lives of women, men and children in developing countries today. Moreover, because of the health risks, nutritional demands, and future impacts of reproduction, the health of women during their reproductive years is a key determinant of the amount of human capital that will be developed at the household level. As a result, ensuring that women are healthy during their reproductive years should be a key component of any strategy that seeks to promote socioeconomic development.

Using human capital to understand the role reproductive health plays in development offers many advantages. First, human capital provides a sound conceptual framework for policy discussions on how to improve the well-being of women and children. Second, by focusing on the productive potential of the household, a human capital framework captures both the direct and indirect effects, or synergistic effects, associated with human resource investments at the household level. Research has demonstrated time and again the importance of the synergistic effects among different human resources (e.g., Simmons, 1987; Schultz, 1988; Kelley and Nobbe, 1990). A human capital approach provides a way to understand how the multiple impacts of human resource investments ultimately produce development. Finally, a human capital framework promotes consistency and efficiency in the formulation of social policy.

## **Appendix**

### **Findings Regarding the Impact of Reproductive Health Interventions on Human Capital**

The framework proposed in this paper suggests many direct and indirect impacts of reproductive health interventions on human capital formation. The direct impacts are relatively well-known and require little comment beyond noting that they are well documented elsewhere. However, the indirect effects are not well known or reported.

This short appendix presents some illustrative literature that may support the hypotheses presented in this paper. The purpose of this paper was not to prove our hypotheses but rather to open a debate. Therefore the following is suggestive of the kind of literature or studies that points in the direction of providing evidence for the assertions made in this paper.

#### **Impact of Education**

Schultz (1994a) surveys literature showing the positive impact of education on human capital development.

Chowdury (1992) finds that educated women in Bangladesh are better able to allocate resources within the household and to educate their children.

Kumar (1992) finds that greater education and freedom for women in India contributes to reducing infant mortality.

Turner (1991) finds that better educated Nigerian women are better able to seek out prenatal care.

Birdsall and Sabot (1994) speculate on the positive impacts on children of a conducive learning environment, which could include well educated and healthy parents.

#### **Impact of Family Planning**

Schuler et al. (1996) outline how the nature of a family planning service delivery system may actually reinforce patterns of patriarchy and low levels of economic and social freedom in Bangladesh.

DeGraff, Bilsborrow and Herrin (1993) describe children's time use across different family sizes in the Philippines.

Lloyd and Gage-Brandon (1993a) show that high fertility has a deleterious effect on school drop out rates for older siblings in Ghana.

Knodel et al. (1990a, 1990b, 1990c) demonstrate the positive impacts of smaller family sizes on children's education, family well-being and familial support for the elderly in Thailand.

Hill (1971) finds that the health consequences of teenage pregnancy in the United States has negative implications for wage rates and labor force participation.

Adair (1995) finds higher labor force participation rates among sterilized women in the Philippines.

### **Impact of Reproductive Health**

Schultz and Tansel (1994) find a positive impact on wages due to general health improvements in Ghana and Côte d'Ivoire.

Schultz (1994a) surveys literature showing a positive impact of general health on human capital development.

Over et al. (1992) lay out a framework that describes the various consequences of general adult ill-health. This framework might be useful for developing a study design for the human capital impact of any particular reproductive health problem.

#### **1. Unwanted Pregnancies**

Baydar and Grady (1993) find that children born of mistimed or unwanted pregnancies have lower scores on verbal development tests. The study controls for various background characteristics.

Kubicka et al. (1994), David et al. (1988) and Matajek et al. (1978) compare children who were born to women who were denied abortions versus those who were born to women with accepted pregnancies. The studies show that the former were less well adjusted socially and more emotionally disturbed.

Bruce, Lloyd and Leonard (1995) review the literature concerning the impact of child wantedness, impact of being orphaned, number of siblings and fostering. They find that, in general, being unwanted, being orphaned and having many siblings are all detrimental to child development. The impact of fostering is a bit more difficult to assess since there are many motives for fostering children out. For example, fostering can be the result of familial misfortune, but it can also be a mechanism for expanding a child's educational opportunities.

#### **2. Maternal Morbidity and Mortality**

Mahler (1989) claims that tens of millions of women suffer pregnancy-related illnesses and impairments that undermine their social and economic productivity.

#### **3. Reproductive Tract Infections/STDs**

Stray-Pedersen (1980) presents a cost-benefit analysis of a serologic screening program to prevent congenital syphilis. The study considers the health costs as well as future productivity losses.

#### **4. HIV/AIDS**

Cuddington (1993), Davachi et al. (1988), Katabaro (1993) and Ainsworth and Koda (1993) find various negative impacts of AIDS on human capital formation and family welfare.

Shaeffer (1994) presents a review of the literatures related to the impacts of HIV/AIDS on education. The publication contains an extensive bibliography.

## **5. Reproductive Cancers**

Nothing in preliminary search.

## **6. Female Genital Mutilation**

Nothing in preliminary search.

## **7. Sex and Gender-Based Violence**

Hyman (cited in Heise, 1994) reports evidence that gender and sex-based violence can have adverse consequences in terms of future educational attainment and income levels for women who have been abused.

## **8. Infertility**

Nothing in preliminary search except a few ethnographic accounts of the ostracization of infertile women (or of women with infertile partners).

### **Impact of Nutrition**

Schultz (1994a) surveys literature showing the positive impact of nutrition on human capital development.

Fogel (1994) claims that caloric intake has an important impact on physical and mental effort independent of general health status.

Morrow et al. (1988) and Fergusson et al. (1982) find possibly small positive impacts of breastfeeding on infant cognitive development. To an even less certain extent, breastfeeding may also have a positive impact on the cognitive development of toddlers and older children.

Li et al. (1994) find that iron supplementation has a positive impact on the ability to do work through increases in productivity.

Levin et al. (1991) review the literature related to cognitive development and productivity losses due to iron, iodine and vitamin A deficiencies.

Tinker et al. (1994) review briefly some of the literature relating nutrition to productivity, family welfare and poverty reduction.

### **Impact of Economic Rights/Equality**

Kumar (1992) finds that greater education and freedom for women in India contributes to reducing infant mortality.

Castle (1993) finds that female status differentials have significant impacts on the care of children.

Bennett (1992) finds that direct access to income by women in India has a positive impact on all aspects of family human capital development.



Widayatun (1991) demonstrates that variations in women's status in Java are closely related to maternal and child health.

Lloyd and Gage-Brandon (1993b) show that consumption per capita in Ghana is highest in families in which women have a primary role in the provision of cash earnings.

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